

Serial No.: 10/678,693
Reply to Office Action of: September 8, 2005
Atty. Docket No.: JJK-0329 (P2002J099)

REMARKS

Claims 1,8,15 and 20 have been amended to specify that the hydrotreating catalyst contains Ni, Co, Mo and or W as metals. This is supported on page 8, paragraph 23.

Claims 5-7, 12-14, 19, 24 and 26-37 have been cancelled without prejudice.

REJECTION OF CLAIMS UNDER 35 U.S.C. 103(A)

The Examiner rejected claims 1-4 and 15-18 under 35 U.S.C. 103(a) as being unpatentable over Baker et al. (5,951,848) in view of Kresge et al. (5,837,639) and either Benazzi et al. (6,884,339) or Carroll et al. (6,517,704).

THE EXAMINER'S POSITION

The Examiner cited Baker as disclosing a process for catalytic dewaxing a feedstock. The feedstock, which comprises about less than 5,000 ppm of sulfur compounds and about 50 ppm of nitrogen compounds, is first passed into a hydrotreating zone to remove nitrogen and sulfur compounds. The hydrogenating zone is operated at a temperature of from 300 to 450° C, at a pressure of from 6900 to 20700 kPa, at a LHSV of from 0.1 to 10 hr⁻¹, and at a hydrogen rate of from 200 to 800 SCF/Bbl (900 to 1800 m³/m³). The effluent from the hydrotreating zone is entirely passed into a dewaxing zone containing a dewaxing catalyst including ZSM-48, a metal hydrogenation component (e.g., Pt or Pd). The dewaxing zone is operated at conditions similar to the hydrotreating zone. The product from the dewaxing zone is further treated in a hydrofinishing zone. (See col. 1, lines 9-20; col. 2, line 46 through col. 3, line 3; col. 4, line 14 through col. 5, line 29; col. 8, line 1 through col. 10, line 47)

Baker does not specifically disclose that the effluent from the dewaxing step is passed into a hydrofinishing zone without disengagement and does not disclose that the hydrofinishing catalyst is MCM-41.

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Both Benazzi and Carroll disclose a hydroprocessing process wherein an effluent from the dewaxing step is directly passed into a hydrofinishing zone without disengagement. (See Benazzi col. 8, lines 36-38; Carroll col. 5, lines 53-57).

Kresge teaches the use of MCM-41 as a hydrotreating catalyst. (See col. 4, lines 57-68; col. 5, lines 1-16; col. 33, lines 33-37).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Baker by passing the effluent from the dewaxing step directly into a hydrofinishing zone without disengagement because both Benazzi and Carroll teach that it is advantaged to pass the entire dewaxed stream from the dewaxing stage to the hydrofinishing zone.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Baker by using MCM-41 as a hydrofinishing catalyst because Kresge teaches that MCM-41 is a highly effective hydrotreating catalyst.

APPLICANTS' POSITION

Baker teaches two different hydrotreating steps. The first hydrotreating step in conjunction with solvent extraction reduces the sulfur and nitrogen levels to the less than 5000 ppmw and 50 ppmw, respectively, needed for the second high activity hydrotreating step to operate in conjunction with the dewaxing catalyst (col 7, lines 42 - 67, col. 8, lines 1 - 16 and 42 - 60). The second high activity hydrotreating uses noble metals because of their good hydrogenation activity provided that heteroatom poisoning can be avoided (col. 8, lines 49 - 53). The two types of hydrotreating steps are further contrasted in col. 9, lines 1 - 12 wherein it is noted that the effluent second hydrotreating step passes directly over the dewaxing catalyst without any pressure reduction or light product separation step. To further contrast the different hydrotreating steps, the patent teaches that hydrotreaters do not operate in cascade with a cat dewaxer (col 9, lines 10 - 12).

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The two separate hydrotreating steps are contrasted in the following passages from Baker:

Col. 8, lines 42-60:

"The catalytic dewaxing step in this invention is carried out with a catalyst system comprising two catalysts acting in synergy. The initial catalyst is a high activity hydrotreating catalyst. Such a catalyst is capable of operating at relatively high space velocities and low temperatures. Since it is preferred to practice this invention in a single reactor vessel, the hydrotreating catalyst must have sufficient activity at the temperature at which the dewaxing catalyst operates. Therefore hydrotreating catalysts containing noble metals such as platinum or palladium are preferred in this invention since they have good hydrogenation activity if poisoning with heteroatoms can be avoided. Catalysts containing Group VII and Group VIII metals can be used but are less desired generally because they have lower activity than noble metal catalysts. The amount of noble metals present on the catalyst can range from 0.1% to 5 wt. %, preferably between 0.2 wt. % and 2 wt. %. Noble metals may be used in combination such as platinum and palladium in preferred ratios between such as platinum and palladium in preferred ratios between 2:1 and 1:5 platinum-to-palladium."

Col. 8, line 67 - Col. 9, line 12

"The hydrotreating step employed in this invention differs significantly from hydrotreating used in combination with solvent extraction to improve base stock Viscosity Index. Firstly, the hydrotreating catalyst upstream of the dewaxing catalyst provides no VI boost to the finished lube. Base oil VI is nearly identical for the case where the dewaxing catalyst operates alone or in tandem with the hydrotreating catalyst. Secondly, the effluent from the hydrotreating catalyst passes directly over the dewaxing catalyst without any pressure reduction or light product separation steps. As typically

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practiced, both hydrocrackers and hydrotreaters do not operate in cascade with a catalytic dewaxer."

The Examiner's position mixed the two hydrotreating steps as if they were the same. This is clearly not the case.

In contrast, applicants' amended claim 1 states that the feedstock containing up to 20000 ppmw S and 1000 ppmw N is hydrotreated with a catalyst containing a combination of the metals Ni, Co, Mo and W and that the gases containing N- and S - contaminants as passed to the ZSM-48 dewaxing catalyst without disengagement. In Baker, it is the effluent from the second hydrotreating step that passes to the cat dewaxing step. Applicants' amended claims do not read on such a two step hydrotreating process. Baker teaches away from Applicants' claim 1 wherein the effluent from their hydrotreating step (which corresponds to the hydrotreating step in Col. 9, lines 2-3) goes to cat dewaxing without disengagement. In fact, feed L of Baker (col 11, lines 10 - 15) is a solvent extracted, hydrotreated feed that has obviously been separated from any gases created during hydrotreating.

Moreover, the amended claims do not read on the synergistic two catalyst system of Baker. Applicants' dewaxing catalyst consists essentially of ZSM-48. That the high activity hydrotreating catalyst of Baker is essential to the two catalyst system, is evident from the Col. 8, lines 42-60 passage cited above.

Assuming arguendo that the secondary references to Kresge, Carroll and Benazzi teach as proposed by the Examiner, Applicants' amended claim 1 would not be taught or suggested by the combination of references because the primary reference to Baker teaches two separate hydrotreating steps wherein the second hydrotreating step operates synergistically with dewaxing catalyst. Applicants have no such hydrotreating step. Applicants' hydrotreating step operates with high S/N feeds, uses non-noble metal catalysts and passes this effluent to dewaxing without disengagement.

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With regard to claims 15 - 18, the feed to the ZSM-48 dewaxing catalyst in applicants' claim 15 can contain up to 20,000 ppmw sulfur and up to 1000 ppmw nitrogen. This is well outside the teachings of Baker (col. 7, lines 49 - 56). ZSM-48 of applicants' amended claim 15 is more tolerant of sour environments than other 10 ring zeolites.

THE EXAMINER'S SECOND REJECTION

The Examiner rejected claims 20-23 under 35 U.S.C. 103(a) as being unpatentable over Xiao et al. (6,264,826) in view of Kresge et al. (5,837,639) and either Benazzi et al. (6,884,339) or Carroll et al. (6,517,704).

THE EXAMINER'S POSITION

The Examiner cited Xiao as disclosing a process for preparing lubricating base oils from a sulfur containing feedstock. The feedstock is derived from a solvent extracting process wherein foots oils is prepared by separating oil from the wax. The foot oils, which comprises about 0.5 to 2.5 wt.% (5000 to 25,000 ppm) of sulfur compounds and about 50 to 2000 ppm of nitrogen compounds, is fed into a hydrotreating zone wherein nitrogen and sulfur compounds are removed. The hydrotreating is operated at a temperature of from 260 to 427° C, at a pressure of from less than 11 Mpa, at LHSV of about 0.5, and at hydrogen rate of about 722 m³/m³. The entire effluent from the hydrotreating zone is then fed into a dewaxing zone containing a dewaxing catalyst including ZSM-5 and SAPO-11, a metal hydrogenation component (e.g., Pt or Pd). The dewaxing process is operated at temperature of from 400 to 900° F, at a pressure of from 45 to 20.8 Mpa, at LHSV of from about 0.1 to 5 hr⁻¹, and at hydrogen gas rates of from 89.1 to 1780 m³/m³. The product from the dewaxing zone is then passed into a hydrofinishing zone to provide a final product. (See col. 2, line 51 through col. 6, line 59; col. 8, line 53 through col. 10, line 40).

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Xiao does not specifically disclose that the effluent from the dewaxing step is passed into a hydrofinishing zone without disengagement and does not disclose that the hydrofinishing catalyst is MCM-41.

Both Benazzi and Carroll disclose a hydroprocessing process wherein an effluent from the dewaxing step is directly passed into a hydrofinishing zone without disengagement. (See Benazzi col. 8, lines 36-38; Carroll col. 5, lines 53-57).

Kresge teaches the use of MCM-41 as a hydrotreating catalyst. (See col. 4, lines 57-68; col. 5, lines 1-16; col. 33, lines 33-37).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Xiao by passing the effluent from the dewaxing step directly into a hydrofinishing zone without disengagement because both Benazzi and Carroll teach that it is advantaged to pass the entire dewaxed stream from the dewaxing stage to the hydrofinishing zone.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Xiao by using MCM-41 as a hydrofinishing catalyst because Kresge teaches that MCM-41 is a highly effective hydrotreating catalyst.

APPLICANTS' RESPONSE

The Examiner's comments that the entire effluent from the hydrotreating zone is fed into a dewaxing zone containing a dewaxing catalyst including ZSM-5 and SAPO-11, and a metal hydrogenation component (e.g. Pt and Pd). Xiao, col. 8, line 65 to col. 9, line 12 notes that the effluent from the hydrotreating step contains a gaseous portion and a liquid portion. Several dewaxing options are given including (a) contacting the entire

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effluent in a dewaxing zone, with or without added hydrogen, with dewaxing catalyst; (b) separating the liquid and gaseous components, and contacting the liquid components with fresh hydrogen in a dewaxing zone; and (c) separating the liquid and gaseous components, removing contaminants from the gaseous portion, adding fresh hydrogen if needed to the purified gaseous portion, and contacting the resultant gaseous stream containing fresh hydrogen with the liquid portion in the dewaxing zone.

Merely listing something as an option does not mean that the option is to be selected. In fact, the opposite is true because patentee states in col 9, lines 13 - 16 that "in the present process, at least a portion, and preferably the entire liquid portion, of the effluent from the hydrotreating step is contacted with a hydrodewaxing catalyst to reduce the pour point of the hydrotreated oil".

Thus only the liquid portion is passed on to dewaxing.

Second, there is no mention of ZSM-48 in col. 9, lines 46 - 61. Amended claim 20 states that applicants' dewaxing zone consists essentially of ZSM-48 and therefore does not read on the catalysts of Xiao.

Third, the preferred SAPO is SAPO-11 loaded with Pt/ Pd (col. 10, lines 28 - 40). Pt or Pd loaded SAPO-11 would be sensitive to a high sulfur environment.

Fourth, the Examples start with a hydrotreated product (Examples 6-8) and thus separated from any gaseous contaminant.

The hydrogenation of the dewaxed effluent is described in col. 11, line 39 to col. 12, line 39. The preferred hydrogenation catalyst is a macroporous catalyst, i.e. one having macropores of diameter greater than 1000 Å (col. 12, lines 11 - 17). These catalysts are noble metals on an inorganic oxide matrix (and hence amorphous) (col. 12 lines 7-10).

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In contrast, MCM-41 is a crystalline mesoporous material. Mesoporous materials by definition have pores smaller than macropores. Thus Xiao teaches away from MCM-41. Therefore it would not be obvious to combine Xiao with Kresge.

Assuming arguendo that Benazzi and Carroll are combined with Xiao and Kresge, applicants' claims 20 - 23 would not be taught or suggested for the reasons noted above.

THE EXAMINER'S THIRD REJECTION

The Examiner rejected claims 8-11 under 35 U. S. C. 103(a) as being unpatentable over references as applied to claims 1-4 above, and further in view of either Lucien et al. (4,906,350) or Cody et al. (5,935,417).

THE EXAMINER'S POSITION

Baker does not specifically disclose that the dewaxing zone comprises a second catalyst. Both Lucien and Cody teach that ZSM-5 and/or ZSM-48 can be utilized in a dewaxing process. (See Lucien, claim 2; Cody; col. 7, lines 10 - 16).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Baker by using a second catalyst such as ZSM-5 because both Lucien and Cody teaches that ZSM-5 and ZSM-48 have equivalent function in a dewaxing process. It would reasonably expect that the results would be the same or similar when using the individual catalyst or combination of both in the process of Baker.

APPLICANTS' RESPONSE

Applicants' amended claim 8 is distinguished over the Baker reference for the reasons noted above. Applicants' amended claim does not read on the two catalyst dewaxing system of Baker. With regard to the new references to Lucien and Cody, the

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Examiner expresses the view that ZSM-5 and ZSM-48 have equivalent function.
Amended claim 8 does not read on ZSM-5.

THE EXAMINER'S FOURTH REJECTION

The Examiner rejects claim 25 under 35 U.S.C. 103(a) as being unpatentable over references as applied to claims 20-23 above, and further in view of Cody et al. (5,935,417).

THE EXAMINER'S POSITION

Xiao does not specifically disclose a step of blending a raffinate feedstock and at least one of a slack wax or foots oil.

Cody discloses a step of blending a raffinate feedstock with foots oil to form a blended feedstock. (See col. 5, lines 9-15).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Xiao by using the blend feedstock of Cody because any waxy feedstock can be used in the process of Xiao. Therefore, it would be expected that the blend feedstock would be successfully treated in the process of Xiao.

APPLICANTS' POSITION

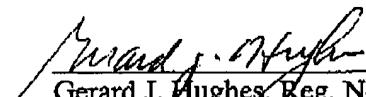
Assuming arguendo that Cody is used in the manner suggested by the Examiner, claim 25 is dependent on claim 20 and is distinguished for the reasons noted above for claim 20.

Based on the preceding arguments and amendments, the Examiner is requested to reconsider and withdraw all objections and rejections and pass this application to allowance. The Examiner is encouraged to contact applicants' attorney should the Examiner wish to discuss this application further.

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